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LABORATORY EVALUATION OF AUSTRALIAN RATION PACKS, (U)
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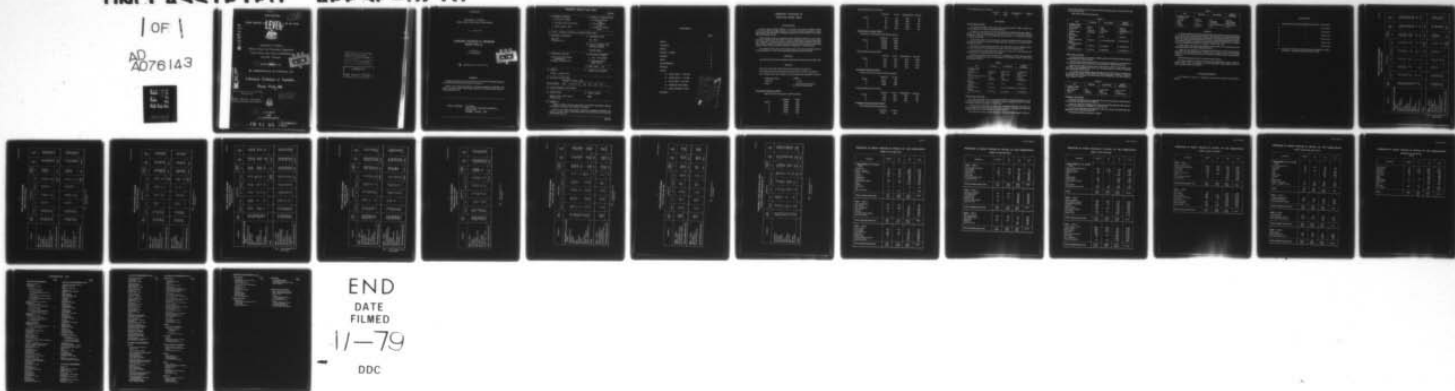
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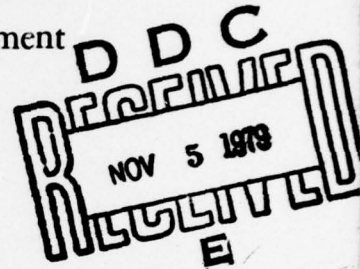


Department of Defence

Defence Science and Technology Organisation

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Scottsdale, Tasmania



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Laboratory Evaluation of Australian

Ration Packs, (u)

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P. E. BODY
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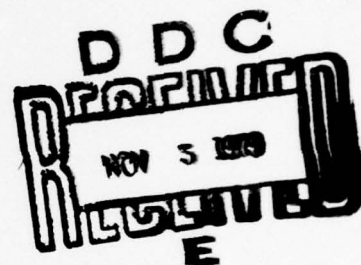
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DEPARTMENT OF DEFENCE
ARMED FORCES FOOD SCIENCE ESTABLISHMENT

AFFSE REPORT 3/78

LABORATORY EVALUATION OF AUSTRALIAN
RATION PACKS (U)

P. E. BODY and
C. H. FORBES-EWAN



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SUMMARY

Results of analyses of ration pack items of the 1976/77 packaging programme are presented. Energy values are reported in Kilojoules.

Some of the rations have become nutritionally unbalanced, particularly with respect to protein content. Total energy values of some rations are also below the recommended level. (U)

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- D. Emergency Flying Ration
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LABORATORY EVALUATION OF AUSTRALIAN RATION PACKS

INTRODUCTION

Previous reports (AFFSE 1970-77)¹⁻⁷ have given the results of analyses of ration packs from preceding packaging programmes. This report details the evaluation of individual samples from the 1976-77 packaging programme with the exception of the Patrol Ration (Papua/New Guinea).

Single samples of each ration component were analysed for moisture, fat, ash, protein, vitamin B₁ (thiamine) and salt (NaCl). A value for carbohydrate content was calculated (by "difference"). This was used with the protein and fat results to calculate total energy value of each component and the proportion of energy derived from protein, fat and carbohydrate. Energy values are reported in Kilojoules (1 Kilojoule \equiv 4.186 Kilocalories).

The contents of the various ration packs are given in the Annexes together with the chemical evaluation. In Annex E the total energy distribution patterns are shown.

METHODS

The methods used for chemical analyses are detailed in a previous report (AFFSE 4/70).

RESULTS

A summary of the results is given below with full details in Annexes A.-D.

The recommended dietary allowances (Thomas and Corden, 1977)⁸ are as follows:

For a "reference man" with a Grade II level of physical activity (applicable to infantry)

Total energy intake	13,400 kJ
Vitamin B ₁	1.1 mg
Protein	70 g minimum (should also be 10-12% of total energy)

Combat Ration (One Man) 1976-77

Menus A-E of this ration give the following analysis.

	Energy (kJ)	B ₁ (mg)
Type A	14,909	0.93
B	14,955	0.99
C	15,580	0.90
D	14,577	0.91
E	14,270	0.85

Energy distribution was as follows:

	Protein (%)	Fat (%)	Carbohydrate (%)	Protein (g)
Type A	9.7	31.7	58.6	86
B	9.5	32.0	58.5	85
C	9.1	33.4	57.5	84
D	9.7	31.9	58.4	84
E	12.0	35.5	52.5	102

Combat Ration (Ten Man) 1976-77

Menus A-D of this ration gave the following analysis:

	Energy (kJ)	B ₁ (mg)
Type A	133,201	29.82
B	121,422	19.91
C	115,933	19.05
D	131,342	17.86

Energy distribution was as follows:

	Protein (%)	Fat (%)	Carbohydrate (%)	Protein (g)
Type A	15.8	28.0	56.2	1,046
B	15.4	28.7	55.9	1,119
C	16.8	28.1	55.1	1,314
D	13.2	27.8	59.0	1,022

Patrol Ration (One Man) 1976-77

Menus A-C of this ration gave the following analysis:

	Energy (kJ)	B ₁ (mg)
Type A	12,141	2.36
B	12,227	4.24
C	12,062	3.68

Energy distribution was as follows:

	Protein (%)	Fat (%)	Carbohydrate (%)	Protein (g)
Type A	21.5	25.5	53.0	155
B	20.9	26.9	52.2	152
C	19.9	24.3	55.8	143

Emergency Flying Ration RAAF 1976-77

This ration gave the following analysis:

Energy (kJ)	B ₁ (mg)
13,372	3.85

Energy distribution was as follows:

Protein (%)	Fat (%)	Carbohydrate (%)	Protein (g)
9.7	26.6	63.7	77

DISCUSSION

Combat Ration One Man

All rations were high in total energy and were approximately 1,000 kJ higher than results obtained in the 1975-76 ration pack evaluation.

Vitamin B₁ levels were lower than those obtained on 1975-76 ration packs (approximately 1.0 mg). The decrease was due to the low vitamin B₁ on chocolate, (0.15 mg compared to 1.48 mg). The results obtained were below the 1.1 mg level recommended by Thomas and Corden.

In all menus, except E, the percentage of protein was below the 10% recommended by Thomas and Corden. However, the total weight was in excess of the minimum recommended level of 70 g.

Salt levels in all ration packs were lower than those determined from 1975-76 results. This lower level was due to the decreased salt level in most components analysed.

Ration pack E had energy distribution different from packs A-D. This difference was caused by the lack of carbohydrates in corned beef.

Generally, analytical results obtained were unsatisfactory with the following items outside the prescribed chemical limits stipulated in the Australian Defence Forces Food Specifications (Table 1).

TABLE 1

Item	Constituent	Level Detected	ADFFS Requirement
COMMON ITEMS			
Chocolate	Vitamin B ₁	0.33mg/100g	2.2mg/100g min
Survival Biscuits	Moisture	6.8%	4% max
Cheese	Fat	43.61% FWFS	45% min FWFS
Condensed Milk (Sweetened)	Fat	5.7%	9% min
Butter Concentrate	Moisture	0.4%	0.3% max
Coffee	Vitamin B ₁	7.8mg/100g	21mg/100g min
MENU B			
Corned Beef Hash	Moisture	74.9%	73.0% max
MENU D			
Beef Soup Powder	Vitamin B ₁	Less than 0.05mg/100g	5.3mg/100g min
MENU E			
Chicken Soup Powder	Vitamin B ₁	0.2mg/100g	5.3mg/100g min

Combat Ration (Ten Man)

All ration packs were low in total energy (134,000 kJ recommended) with A, C and D being lower than similar results on 1974-75 (no samples analysed for 1975-76). Menu B being higher (133,201 kJ compared to 126,571 kJ).

In all menus the percentage of protein had increased over 1974-75 ration packs and were all above the 10-12% range set by Thomas and Corden. The weight of protein was above the 70g minimum recommended by the same authors.

Salt levels were similar to those obtained in 1974-75 with the exception of Menu C.

In this case a high salt level in chicken noodle soup powder gave an extremely high total for the particular menu.

Table 2 lists items below specifications.

TABLE 2

Item	Constituent	Level Detected	ADFFS Requirement
COMMON ITEMS			
Butter Concentrate	Moisture	0.9%	0.3% max
Curry Powder	Ash	14.5%	12.0% max
Coffee	Vitamin B ₁	5.4mg/100g	21.0mg/100 g min
Vegetable Extract	Salt (NaCl)	9.0%	10-14%
MENU A			
Beef and Gravy	Fat	13.4%	12.0% max
MENU B			
Tomato Soup Powder	Vitamin B ₁	Less than 0.05mg/100g	5.3mg/100g min
MENU C			
Chicken Noodle Soup Powder	Vitamin B ₁	0.14mg/100g	5.3mg/100g min
MENU D			
Pea & Ham Soup Pdr	Vitamin B ₁	0.39mg/100g	5.3mg/100g min

Patrol Ration One Man

All rations were low in total energy (1,600 kJ approx) and illustrated a slight reduction in levels compared to 1975-76 results.

Vitamin B₁ levels were higher than the 1.1 mg minimum requirement recommended by Thomas and Corden and were all similar to results obtained on 1975-76 ration packs.

Salt levels were higher in Menus B and C than results on 1975-76 ration packs. However Menu A was particularly low due to the low levels detected in Lamb and Vegetable Curry and Savoury Steak Fingers.

In all menus the percentage protein was higher than the 12% maximum recommended by Thomas and Corden (21.5%, 20.9% and 19.9% respectively). Similarly, weights of protein were well in excess of the 70 mg minimum recommendation. Items below specification are shown in Table 3.

TABLE 3

Item	Constituent	Level Detected	ADFFS Requirement
COMMON ITEMS			
Processed Cheese	Fat	44.75% FWFS	45% min FWFS
Milk Instant	Moisture	5.6%	4.5 max
Coffee	Vitamin B ₁	5.1mg/100g	21.0mg/100 g min

Emergency Flying Ration

The ration was slightly low in energy (226 kJ) but was an increase on results obtained on the 1975-76 ration packs (low by 1,200 kJ).

Vitamin B₁ levels were satisfactory but lower than 1975-76 (3.85 mg cf 8.87 mg) due to the low results obtained on chocolate (3.1 mg cf 8.2 mg).

The salt level determined was satisfactory while the protein level determined was slightly lower than the recommended 10%.

Items below specification are shown in Table 4.

TABLE 4

Item	Constituent	Level Detected	ADFFS Requirement
COMMON ITEMS			
Instant Milk	Moisture	5.1%	4.5% max
Chocolate	Vitamin B ₁	1.9mg/100g	2.2mg/100g min
Cheese	Fat	43.6% FWFS	45% min FWFS
Coffee	Vitamin B ₁	Less than 0.05mg/100g	21.0mg/100g min
Beef Block	Moisture	4.2%	7-11%

GENERAL

The results indicate that generally there has been little change in the nutritional balance of the ration packs. Combat Ration (One Man) and Emergency Flying Rations were both below the minimum percentage protein requirements. Patrol Ration (One Man) and Combat Ration (Ten Man) were both higher than the maximum percentage requirements. However, in all cases the weight of protein was in excess of the minimum requirements. This excess protein could lead to thirst problems, as stated in AFFSE Report 1/78.

Combat Ration (One Man) had satisfactory energy levels, the remaining ration types analysed being below the recommended energy levels.

Vitamin B₁ was satisfactory in all except Combat Ration (One Man) where the levels were below the recommended levels. Powdered soups (Tables 1 and 2) and chocolate (Tables 1, 2 and 4) were extremely low in Vitamin B₁ and both should be corrected as soon as possible.

Salt levels were generally similar to those previously reported.

The large numbers of components outside chemical specifications makes it clear that suitable quality control on products is not being undertaken. Steps should be taken to correct this failure with utmost urgency.

ACKNOWLEDGEMENTS

To C. Nelson, M. Lette and F. Kingsmith who carried out the bulk of the chemical analysis.

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1.

Annex A

1976-77 PACKAGING PROGRAMME
COMBAT RATION (ONE MAN)

COMPONENT	NET WEIGHT g	COMPOSITION %					VITAMIN mg/PACK	kJ PER PACK	kJ PER 100g
		WATER	FAT	ASH	PROTEIN	SALT			
ITEMS COMMON TO ALL RATION TYPES									
Cereal Block	59.2	3.9	19.8	1.2	9.0	0.3	BDL	1,191	2,011
Biscuits — Survival	99.2	6.8	17.9	1.9	9.4	1.0	0.252	1,894	1,910
Biscuits — Shortbread	87.9	4.1	19.3	1.3	7.3	0.7	BDL	1,753	1,995
Cheese	53.3	36.3	27.8	6.4	24.8	2.0	0.044	755	1,416
Chocolate	46.6	4.1	20.3	1.8	6.4	0.3	0.152	936	2,007
Chewing Gum	16.4	3.0	—	—	—	—	—	268	1,634
Butterscotch	49.5	1.9	4.9	0.7	2.1	0.7	0.009	861	1,739
Condensed Milk (Sweet)	70.2	22.4	5.7	1.9	9.5	0.6	0.025	976	1,391
Sugar	84.0	—	—	—	—	—	—	1,416	1,680
Tea Bags	2.2	—	—	—	—	—	—	—	—
Coffee Instant	3.9	2.9	—	6.1	20.6	0.2	0.301	59	1,529
Salt	7.1	—	—	—	—	—	—	—	—
Butter Concentrate	25.5	0.4	90.0	3.2	3.7	2.5	BDL	895	3,510
TOTAL					46.73	g/pack 11.4	0.783	11,004	
MENU — TYPE A									
Ham and Egg Ration	114.3	72.7	12.6	1.2	13.3	0.1	BDL	805	704
Curry Powder	3.5	8.6	7.0	8.8	13.7	1.8	0.024	53	1,536
Beef and Vegetables	229.5	73.6	6.3	0.7	8.8	0.1	0.126	1,293	563
Instant Rice	52.5	9.9	0.3	0.4	6.1	0.2	BDL	794	1,513
Plum Jam	23.5	24.3	—	—	0.9	—	BDL	299	1,272
Fruit Juice Powder (Orange)	14.1	0.3	—	0.6	—	0.1	—	234	1,660
Sliced Cling Peaches)	137.8	81.4	—	0.2	—	0.1	—	427	310
TOTAL (including common items)						g/pack 12.25	0.93	14,909	

BDL = Below Detectable Limits
— = Not Analysed

2.

1976-77 PACKAGING PROGRAMME
COMBAT RATION (ONE MAN)

COMPONENT	NET WEIGHT g	COMPOSITION %					VITAMIN mg/PACK	kJ PER PACK	kJ PER 100g
		WATER	FAT	ASH	PROTEIN	SALT			
MENU - TYPE B									
Pork and Beans	104.6	67.3	14.5	1.5	13.6	0.5	0.128	866	829
Curry Powder	3.5	8.6	7.0	8.8	13.7	1.8	0.024	53	1,536
Corned Beef Hash	230.5	74.9	6.7	0.8	8.5	0.5	0.058	1,263	548
Instant Rice	52.5	8.9	0.3	0.4	6.7	0.2	BDL	803	1,530
Raspberry Jam	24.4	25.2	—	—	1.2	—	—	306	1,257
Fruit Juice Powder (Lemon)	14.1	0.7	—	0.7	—	0.6	—	233	1,656
Diced Cling Peaches	137.8	81.4	—	0.2	—	0.1	—	427	310
TOTAL (including common items)						g/pack 13.4	0.99	14,955	
MENU - TYPE C									
Luncheon Meat (Camp Pie)	111.5	64.7	13.1	0.9	6.0	0.8	0.017	951	853
Curry Powder	3.5	8.6	7.0	8.8	13.7	1.8	0.024	53	1,536
Beef with Gravy	228.6	65.2	11.8	0.8	11.6	0.1	0.071	1,871	818
Instant Rice	52.5	8.9	0.3	0.4	6.7	0.2	BDL	803	1,530
Apricot Jam	24.5	25.0	—	—	0.8	—	—	309	1,261
Fruit Juice Powder (Lime)	14.0	0.3	—	0.4	—	0.1	—	234	1,668
Diced Bartlett Pears	138.2	84.2	—	0.5	—	0.1	—	355	257
TOTAL (including common items)						g/pack 12.8	0.90	15,580	

BDL = Below Detectable Limits
 — = Not Analysed

3.

1976-77 PACKAGING PROGRAMME

COMBAT RATION (ONE MAN)

COMPONENT	NET WEIGHT g	COMPOSITION %					VITAMIN mg/PACK	kJ PER PACK	kJ PER 100g
		WATER	FAT	ASH	PROTEIN	SALT			
MENU - TYPE D							B ₁		
Sausage & Veg	117.5	78.7	2.5	1.2	6.7	0.3	BDL	459	391
Soup Powder Beef	15.1	4.2	BDL	19.4	0.3	12.9	BDL	160	1,067
Luncheon Meat	215.7	70.1	11.3	2.1	10.8	0.8	BDL	1,521	705
Blackberry Jam	24.4	25.3	—	—	—	—	0.044	306	1,255
Potato and Onion Powder	48.6	4.3	—	2.3	12.1	0.1	0.015	763	1,569
Diced Two Fruits	140.7	84.5	—	0.1	—	0.1	0.065	364	259
TOTAL (including common items)						g/pack 15.6	0.91	14,577	
MENU - TYPE E									
Beef and Egg Ration	120.4	72.2	10.6	1.3	15.1	0.6	BDL	801	666
Soup Powder Chicken	14.5	2.9	0.2	15.3	—	10.8	0.003	199	1,377
Corned Beef	217.9	69.4	11.8	2.2	17.0	0.7	BDL	1,592	731
Peach Jam	25.3	26.9	—	0.1	—	—	BDL	310	1,226
Diced Two Fruits	140.7	84.5	—	0.1	—	0.1	0.065	364	259
TOTAL (including common items)						g/pack 15.4	0.85	14,270	

BDL = Below Detectable Limits

— = Not Analysed

1976-77 PACKAGING PROGRAMME

COMBAT RATION (TEN MAN)

PACKED MARCH, 1977

COMPONENT	NET WEIGHT g	COMPOSITION %					VITAMIN mg/PACK	kJ PER PACK	kJ PER 100g
		WATER	FAT	ASH	PROTEIN	SALT			
ITEMS COMMON TO ALL RATION TYPES							B₁		
Condensed Milk (Unsweetened)	811.4	71.9	6.9	1.5	8.0	0.4	2.937	4,798	591
Butter Concentrate	336.2	0.9	92.1	2.9	2.1	2.2	0.252	11,940	3,541
Vegetable Extract	101.7	33.3	BDL	13.7	28.9	9.0	8.645	912	897
Sugar	854.6	—	—	—	—	—	—	14,358	1,680
Salt	85.8	—	—	—	—	98.5	—	—	—
Soluble Coffee	58.6	2.6	0.2	8.1	18.1	0.4	3.165	880	1,504
Whole Potatoes	1,821.6	87.3	—	1.1	1.6	1.0	0.692	3,542	195
Tomato Sauce (fortified)	235.4	67.2	—	3.5	1.4	2.6	0.037	1,159	493
Tea	109.6	—	—	—	—	—	—	—	—
Curry Powder	29.6	7.4	6.9	14.5	11.8	9.1	0.030	430	1,454
Bread, Supplement (assumed)	—	—	—	—	—	—	—	30,139	—
TOTAL						g/pack 167.98	15.76	68,158	
MENU — TYPE A									
Mince and Spaghetti	1,775.6	28.3	12.5	1.3	4.2	0.2	7.067	11,352	639
Beef Noodle Soup Powder	131.0	2.0	3.9	20.9	13.4	19.0	0.207	1,803	1,376
Chopped Pork and Cereal	1,364.0	64.2	10.1	2.4	13.4	1.7	5.445	7,684	563
Green Peas	900.8	83.1	—	0.6	5.1	0.5	0.132	2,464	274
Beef with Gravy	1,774.4	63.0	13.4	2.4	17.3	1.6	0.464	16,036	904
Whole Peeled Tomatoes	849.6	93.5	—	0.6	0.8	0.4	0.255	852	100
Fruit Pudding	1,503.2	28.3	12.5	1.3	4.2	0.2	0.492	21,732	1,186
Raspberry Jam	247.7	24.9	—	0.1	1.5	0.1	BDL	3,120	1,259
TOTAL (including common items)						207.2	29.82	133,201	

BDL = Below Detectable Limits

— = Not Analysed

2.

1976-77 PACKAGING PROGRAMME

COMBAT RATION (TEN MAN)

PACKED MARCH, 1977

COMPONENT	NET WEIGHT g	COMPOSITION %						VITAMIN mg/PACK	kJ PER PACK	kJ PER 100g
		WATER	FAT	ASH	PROTEIN	SALT	B ₁			
MENU - TYPE B										
Luncheon Meat - Type I	1,342.8	67.0	11.5	3.6	13.7	2.1	1.450	9,880	736	
Steak and Kidney	1,802.0	71.0	11.0	1.6	10.2	1.0	0.998	12,192	677	
Beef and Beans	1,863.6	65.1	8.0	2.2	13.6	1.2	1.116	13,392	719	
Green Peas	900.8	83.1	-	0.6	5.1	0.5	0.132	2,464	274	
Whole Kernel Sweet Corn	889.4	72.4	0.7	0.8	2.7	0.4	0.450	4,152	467	
Fruit Salad	1,784.4	82.4	-	0.3	0.3	0.1	BDL	5,176	290	
Jam - Blackberry	247.3	19.2	-	0.3	-	0.1	BDL	3,343	1,352	
Tomato Soup Powder	175.7	1.4	5.7	15.4	4.4	13.8	BDL	2,665	1,517	
TOTAL (including common items)						264.81	19.91	121,422		
MENU - TYPE C										
Beef and Vegetable Curry	1,831.2	71.3	6.1	1.8	7.8	1.1	0.531	10,282	562	
Chicken Noodle Soup Powder	1,389.0	2.8	2.4	22.6	13.7	18.7	1.896	1,811	1,304	
Corned Beef	1,372.6	52.5	16.6	3.5	26.7	2.7	BDL	14,936	1,088	
Green Beans	898.8	90.0	-	1.5	1.3	1.3	BDL	1,336	149	
Steak & Tomato Puree	1,728.8	74.1	6.6	1.5	14.4	0.8	0.864	9,492	549	
Carrots	888.0	91.4	-	1.0	0.1	0.8	BDL	1,132	128	
Sliced Clingstone Peaches	1,756.8	81.4	-	0.4	0.5	0.1	-	5,364	305	
Jam Strawberry	262.7	22.4	-	0.1	-	0.1	-	3,421	1,302	
TOTAL (including common items)						525.00	19.05	115,933		

BDL = Below Detectable Limits
- = Not Analysed

3.

1976-77 PACKAGING PROGRAMME
COMBAT RATION (TEN MAN)
PACKED MARCH, 1977

COMPONENT	NET WEIGHT g	COMPOSITION %					VITAMIN mg/PACK	kJ PER PACK	kJ PER 100g
		WATER	FAT	ASH	PROTEIN	SALT			
MENU - TYPE D									
Green Beans	898.8	90.0	—	1.5	1.3	1.3	BDL	1,336	149
Fruit Pudding	1,503.2	28.3	12.5	1.3	4.2	0.2	0.492	21,732	1,186
Steak & Kidney	1,802.0	71.9	11.0	1.6	10.2	1.0	0.998	12,192	677
Pea and Ham Soup Powder	156.0	1.2	5.7	12.4	21.7	10.2	0.608	2,455	1,571
Jam Apricot	256.0	22.5	—	0.2	—	0.1	—	3,325	1,299
Beef and Vegetables	1,819.0	75.4	3.2	1.5	8.4	1.1	BDL	8,256	454
Red Kidney Beans	962.6	66.6	0.3	2.1	7.1	1.3	—	5,124	532
Luncheon Meat - Type 2	1,353.2	69.1	7.9	2.2	12.1	1.4	—	8,764	684
TOTAL (including common items)						267.91	17.86	131,342	

BDL = Below Detectable Limits
 — = Not Analysed

1.

1976-77 PACKAGING PROGRAMME
PATROL RATION (ONE MAN)

COMPONENT	NET WEIGHT g	COMPOSITION %					VITAMIN mg/PACK	kJ PER PACK	kJ PER 100g
		WATER	FAT	ASH	PROTEIN	SALT			
ITEMS COMMON TO ALL RATION TYPES									
Processed Cheese Sticks	43.6	35.6	28.9	3.5	21.6	0.4	0.036	534	1,224
Instant Milk	7.4	5.6	0.1	5.9	34.3	—	0.013	111	1,489
Chocolate	51.8	4.1	22.2	2.2	9.5	0.1	1.401	1,057	2,041
Rice	54.5	11.1	0.3	0.1	8.0	—	0.023	815	1,497
Sugar	85.4	—	—	—	—	—	—	1,435	1,680
Coffee Instant	10.2	3.9	—	6.6	—	0.1	0.519	153	1,504
Tea Bags	6.3	—	—	—	—	—	—	—	—
Salt	7.2	—	—	—	—	98.5	—	—	—
Chewing Gum	15.9	3.2	12.6	0.9	0.5	0.1	—	297	1,876
Biscuits — Shortbread	87.4	4.1	18.4	0.4	3.5	0.1	BDL	1,741	1,991
Biscuits — Raspberry Crunch	87.3	7.8	16.9	0.5	2.4	—	0.044	1,655	1,896
TOTAL						7.4	2.04	7,798	
MENU — TYPE A									
Lamb and Vegetable Curry	107.8	2.7	19.3	3.4	54.3	0.1	0.102	2,139	1,984
Savoury Steak Fingers	108.5	1.3	9.6	2.9	64.7	0.1	0.217	1,965	1,811
Fruit Juice Powder (Orange)	14.2	0.2	0.4	0.3	—	—	BDL	239	1,679
TOTAL (including common items)						7.5	2.36	12,141	

BDL = Below Detectable Limits
— = Not Analysed

2.

1976-77 PACKAGING PROGRAMME
PATROL RATION (ONE MAN)

COMPONENT	NET WEIGHT g	COMPOSITION					VITAMIN mg/PACK	kJ PER PACK	kJ PER 100g
		WATER	FAT	ASH	PROTEIN	SALT			
MENU - TYPE B Beef and Onions Roast Sliced Pork and Gravy Fruit Juice Powder (Lemon)	108.3	2.0	9.1	3.4	58.8	0.9	0.997	1,928	1,779
	108.6	1.8	24.8	2.2	57.3	8.4	1.202	2,317	2,133
	14.0	0.2	—	0.6	—	0.9	BDL	234	1,667
						17.6	4.24	12,277	
TOTAL (including common items)									
MENU - TYPE C Beef and Beans Sweet and Sour Pork Fruit Juice Powder (Lime)	108.9	1.7	14.3	3.1	54.0	1.9	0.436	2,068	1,899
	107.7	1.6	10.6	3.1	53.4	1.9	1.20	1,964	1,824
	13.8	0.3	0.7	0.5	—	1.7	—	232	1,682
						11.7	3.68	12,062	
TOTAL (including common items)									

BDL = Below Detectable Limits
 — = Not Analysed

1.

EMERGENCY FLYING RATION RAAF 1976-77
PACKAGING PROGRAMME PACKED DEC 76

COMPONENT	NET WEIGHT g	COMPOSITION					VITAMIN mg/PACK	kJ PER PACK	kJ PER 100g
		WATER	FAT	ASH	PROTEIN	SALT			
Ration Biscuits	85.5	3.8	12.8	1.4	7.8	BDL	0.171	1,591	1,860
Cereal Block	126.1	4.8	20.0	1.4	8.9	BDL	0.378	2,514	1,994
Chocolate	160.9	4.0	22.7	1.9	6.2	0.1	3.062	3,310	2,057
Milk Powder	11.2	5.1	0.5	5.1	26.0	0.4	0.097	170	1,519
Soup Cubes	29.3	3.7	—	53.9	14.2	44.7	BDL	209	713
Sugar	35.7	—	—	—	—	—	—	600	1,680
Cheese	67.3	36.3	27.8	4.8	12.5	2.4	0.123	732	1,088
Coffee Soluble	11.6	3.7	—	5.4	19.3	0.2	BDL	177	1,527
Butterscotch	77.4	0.7	—	0.3	BDL	—	BDL	1,288	1,664
Salt	9.4	—	—	—	—	98.5	—	—	—
Beef Block	57.6	4.2	27.0	3.1	55.1	—	0.023	1,224	2,125
Fruit Candies	93.6	0.6	—	0.4	—	BDL	BDL	1,557	1,665
TOTAL						24.17	3.85	13,372	

BDL = Below Detectable Limits
 — = Not Analysed

1.

**PROPORTION OF ENERGY PROVIDED BY PROTEIN, FAT AND CARBOHYDRATE
COMBAT RATION (ONE MAN)**

COMPONENT	PROTEIN kJ	FAT kJ	CHO kJ	TOTAL kJ
ITEMS COMMON TO ALL RATION TYPES				
Cereal Block	90	443	658	1,191
Biscuits — Survival	157	671	1,066	1,894
Biscuits — Shortbread	108	641	1,004	1,753
Cheese	222	410	123	755
Chocolate	50	357	529	936
Chewing Gum	—	—	268	268
Butterscotch	18	91	762	861
Condensed Milk (Sweet)	112	150	714	976
Sugar	—	—	1,416	1,416
Tea Bags	—	—	—	—
Coffee Instant	13	—	46	59
Salt	—	—	—	—
Butter Concentrate	16	867	12	895
TOTAL (including common items)	786 7.1%	3,620 32.9%	6,598 60.0%	11,004
MENU — TYPE A				
Ham and Egg Ration	256	545	4	805
Curry Powder	8	9	36	53
Beef and Vegetables	341	545	407	1,293
Instant Rice	54	6	734	794
Plum Jam	4	—	295	299
Fruit Juice Powder (Orange)	—	—	234	234
Sliced Cling Peaches	—	—	427	427
TOTAL (including common items)	1,449 9.7%	4,725 31.7%	8,735 58.6%	14,909
MENU — TYPE B				
Pork and Beans	238	574	54	866
Curry Powder	8	9	36	53
Corned Beef Hash	328	581	354	1,263
Instant Rice	59	6	738	803
Raspberry Jam	5	—	301	306
Fruit Juice Powder (Lemon)	—	—	233	233
Diced Cling Peaches	—	—	427	427
TOTAL (including common items)	1,424 9.5%	4,790 32.0%	8,741 58.5%	14,955

2.

**PROPORTION OF ENERGY PROVIDED BY PROTEIN, FAT AND CARBOHYDRATE
COMBAT RATION (ONE MAN)**

COMPONENT	PROTEIN kJ	FAT kJ	CHO kJ	TOTAL kJ
MENU – TYPE C				
Luncheon Meat (Camp Pie)	112	553	286	951
Curry Powder	8	9	36	53
Beef with Gravy	444	1,016	411	1,871
Instant Rice	59	6	738	803
Apricot Jam	4	–	305	309
Fruit Juice Powder (Lime)	–	–	234	234
Diced Bartlet Pears	–	–	355	355
TOTAL (including common items)	1,413 9.1%	5,204 33.4%	8,963 57.5%	15,580
MENU – TYPE D				
Sausage and Vegetables	132	109	218	459
Soup Powder Beef	1	–	159	160
Luncheon Meat	391	923	207	1,521
Blackberry Jam	–	–	306	306
Potato and Onion Powder	99	–	664	763
Diced Two Fruits	–	–	364	364
TOTAL (including common items)	1,409 9.7%	4,652 31.9%	8,516 58.4%	14,577
MENU – TYPE E				
Beef and Egg Ration	306	480	15	801
Soup Powder Chicken	–	1	198	199
Corned Beef	622	970	–	1,592
Peach Jam	–	–	310	310
Diced Two Fruits	–	–	364	364
TOTAL (including common items)	1,714 12.0%	5,071 35.5%	7,485 52.5%	14,270

3.

**PROPORTION OF ENERGY PROVIDED BY PROTEIN, FAT AND CARBOHYDRATE
COMBAT RATION (TEN MAN)**

COMPONENT	PROTEIN kJ	FAT kJ	CHO kJ	TOTAL kJ
ITEMS COMMON TO ALL RATION TYPES				
Condensed Milk (Unsweetened)	1,089	2,110	1,599	4,798
Butter Concentrate	120	11,705	115	11,940
Vegetable Extract	494	11	407	912
Sugar	—	—	14,358	14,358
Salt	—	—	—	—
Soluble Coffee	178	4	698	880
Whole Potatoes	496	—	3,046	3,542
Tomato Sauce (fortified)	54	—	1,105	1,159
Tea	—	—	—	—
Curry Powder	59	77	294	430
Bread Supplement (assumed)	3,500	1,390	25,249	30,139
TOTAL	5,990 8.8%	15,297 22.4%	46,871 68.8%	68,158
MENU — TYPE A				
Mince and Spaghetti	2,998	5,678	2,676	11,352
Beef Noodle Soup Powder	294	192	1,317	1,803
Chopped Pork and Cereal	3,068	52	4,564	7,684
Green Peas	1,704	—	760	2,464
Beef with Gravy	5,143	8,994	1,899	16,036
Whole Peeled Tomatoes	743	—	109	852
Fruit Pudding	1,046	7,114	13,572	21,732
Raspberry Jam	65	—	3,055	3,120
TOTAL (including common items)	21,051 15.8%	37,327 28.0%	74,823 56.2%	133,201
MENU — TYPE B				
Luncheon Meat — Type I	3,081	5,836	963	9,880
Steak and Kidney	3,078	7,492	1,622	12,192
Beef and Beans	4,261	5,650	3,481	13,392
Green Peas	1,704	—	760	2,464
Whole Kernel Sweet Corn	402	245	3,505	4,152
Fruit Salad	84	—	5,092	5,176
Jam — Blackberry	—	—	3,343	3,343
Tomato Soup Powder	129	376	2,160	2,665
TOTAL (including common items)	18,729 15.4%	34,896 28.7%	67,797 55.9%	121,422

4.

**PROPORTION OF ENERGY PROVIDED BY PROTEIN, FAT AND CARBOHYDRATE
COMBAT RATION (TEN MAN)**

COMPONENT	PROTEIN kJ	FAT kJ	CHO kJ	TOTAL kJ
MENU – TYPE C				
Beef and Vegetable Curry	2,400	4,222	3,661	10,283
Chicken Noodle Soup Powder	320	126	1,365	1,811
Corned Beef	6,158	8,628	150	14,936
Green Beans	199	—	1,137	1,336
Steak & Tomato Puree	4,176	4,332	984	9,492
Carrots	16	—	1,116	1,132
Sliced Clingstone Peaches	150	—	5,214	5,364
Jam Strawberry	—	—	3,421	3,421
TOTAL (including common items)	10,409 16.8%	32,605 28.1%	63,919 55.1%	115,933
MENU – TYPE D				
Green Beans	199	—	1,137	1,336
Fruit Pudding	1,046	7,114	13,572	21,732
Steak and Kidney	3,078	7,492	1,622	12,192
Pea and Ham Soup Powder	569	334	1,552	2,455
Jam Apricot	—	—	3,325	3,325
Beef and Vegetables	2,552	2,171	3,533	8,256
Red Kidney Beans	1,140	114	3,870	5,124
Luncheon Meat – Type 2	2,755	4,036	1,973	8,764
TOTAL (including common items)	17,329 13.2%	36,558 27.8%	77,455 59.0%	131,342

5.

PROPORTION OF ENERGY PROVIDED BY PROTEIN, FAT AND CARBOHYDRATES**PATROL RATION (ONE MAN) 1976-77**

COMPONENT	PROTEIN kJ	FAT kJ	CHO kJ	TOTAL kJ
ITEMS COMMON TO ALL RATION TYPES				
Processed Cheese Sticks	158	228	148	534
Instant Milk	43	—	68	111
Chocolate	83	434	540	1,057
Rice	74	5	736	815
Sugar	—	—	1,435	1,435
Coffee Instant	—	—	153	153
Tea Bags	—	—	—	—
Salt	—	—	—	—
Chewing Gum	1	75	221	297
Biscuits — Shortbread	52	609	1,080	1,741
Biscuits — Raspberry Crunch	35	559	1,061	1,655
TOTAL	446 5.7%	1,910 24.5%	5,442 69.8%	7,798
MENU — TYPE A				
Lamb and Vegetable Curry	984	787	368	2,139
Savoury Steak Fingers	1,179	394	392	1,965
Fruit Juice Powder (Orange)	—	2	237	239
TOTAL (including common items)	2,609 21.5%	3,093 25.5%	6,439 53.0%	12,141
MENU — TYPE B				
Beef and Onions	1,071	372	485	1,928
Roast Sliced Pork and Gravy	1,045	1,018	254	2,317
Fruit Juice Powder (Lemon)	—	—	234	234
TOTAL (including common items)	2,567 20.9%	3,300 26.9%	6,415 52.2%	12,277
MENU — TYPE C				
Beef and Beans	989	588	491	2,068
Sweet and Sour Pork	967	432	565	1,964
Fruit Juice Powder (Lime)	—	4	228	232
TOTAL (including common items)	2,402 19.9%	2,934 24.3%	6,726 55.8%	12,062

6.

PROPORTION OF ENERGY PROVIDED BY PROTEIN, FAT AND CARBOHYDRATES
EMERGENCY FLYING RATION
1976-77

COMPONENT	PROTEIN kJ	FAT kJ	CHO kJ	TOTAL kJ
Ration Biscuits	112	414	1,065	1,591
Cereal Block	189	953	1,372	2,514
Chocolate	168	1,378	1,764	3,310
Milk Powder	49	2	119	170
Soup Cubes	70	—	139	209
Sugar	—	—	600	600
Cheese	141	219	372	732
Coffee Soluble	37	—	140	177
Butterscotch	—	—	1,288	1,288
Salt	—	—	—	—
Beef Block	533	588	108	1,224
Fruit Candies	—	—	1,557	1,557
TOTAL	1,299 9.7	3,554 26.6	8,519 63.7	13,372

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Headquarters, Australian Defence Cooperation Group, (HQ ADCG), P.O. Box 2270, Konedobu, Port Moresby	3	Chief, Food and Nutrition Section, NASA - Manned Spacecraft Center, Houston, Texas	
		Director, U.S. Army Natick Laboratories (Food Laboratory) Natick, Massachusetts, U.S.A.	2
		Director, U.S. Army Medical Research and Nutrition Laboratory, Fitzsimons General Hospital, Denver, Colorado, U.S.A. 80240	2